



2002668

AA DIR  
Arsenic Anomaly  
Globe Plant Site

Revision 0  
January 1998

## DESIGN INVESTIGATION REPORT ARSENIC ANOMALY

**ASARCO Incorporated  
GLOBE PLANT SITE  
DENVER, COLORADO**

Prepared by K. Metz Date 1-6-98

Reviewed by David Key Date 1-6-98

Approved Suzanne V. Gabriele Date 1/8/98  
QA Manager

D. J. Stess Date 1-6-98  
Project Manager

R. H. Miller Date 1/8/98  
Asarco Site Manager

AS-0115

## TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE NO.</u>
<b>TITLE PAGE .....</b>	1
<b>TABLE OF CONTENTS .....</b>	2
<b>1.0 INTRODUCTION .....</b>	3
<b>2.0 SOIL SAMPLING .....</b>	5
2.1 Sample Locations .....	5
2.2 Sample Collection Procedures .....	6
<b>3.0 LABORATORY .....</b>	7
<b>4.0 QUALITY ASSURANCE .....</b>	7
4.1 Data Validation .....	7
4.2 Conclusions .....	7

## LIST OF APPENDICES

**APPENDIX A VICINITY MAPS**

**APPENDIX B ANALYTICAL RESULTS**

## LIST OF FIGURES

<b>Figure 1.1     Globe Plant Area Map .....</b>	4
--	---

## 1.0 INTRODUCTION

This Design Investigation Report (DIR) presents the results of the sampling and analysis of shallow and deep soils in the area surrounding the ASARCO Incorporated (Asarco) Globe Plant in Denver, Colorado (see Figure 1.1) on properties that were selected for evaluation of the anomalous arsenic concentrations during the 1997 sampling season. These samples are in addition to the 0-2 inch and 0-6 inch samples collected as part of the Statement of Work (SOW) program, which are reported in previous DIR's. Properties sampled during the 1997 extended sampling season as part of the Community Soils and Vegetable Gardens Operable Unit will be reported in the 1997 Supplemental (SUP) DIR in the spring of 1998. This DIR includes:

- A brief summary of the additional sampling locations and procedures (Section 2.0),
- A summary of quality assurance (QA) procedures (Section 4.0), and
- Analytical results for the additional samples collected as part of the arsenic anomaly evaluation during the 1997 sampling season (Appendix B).

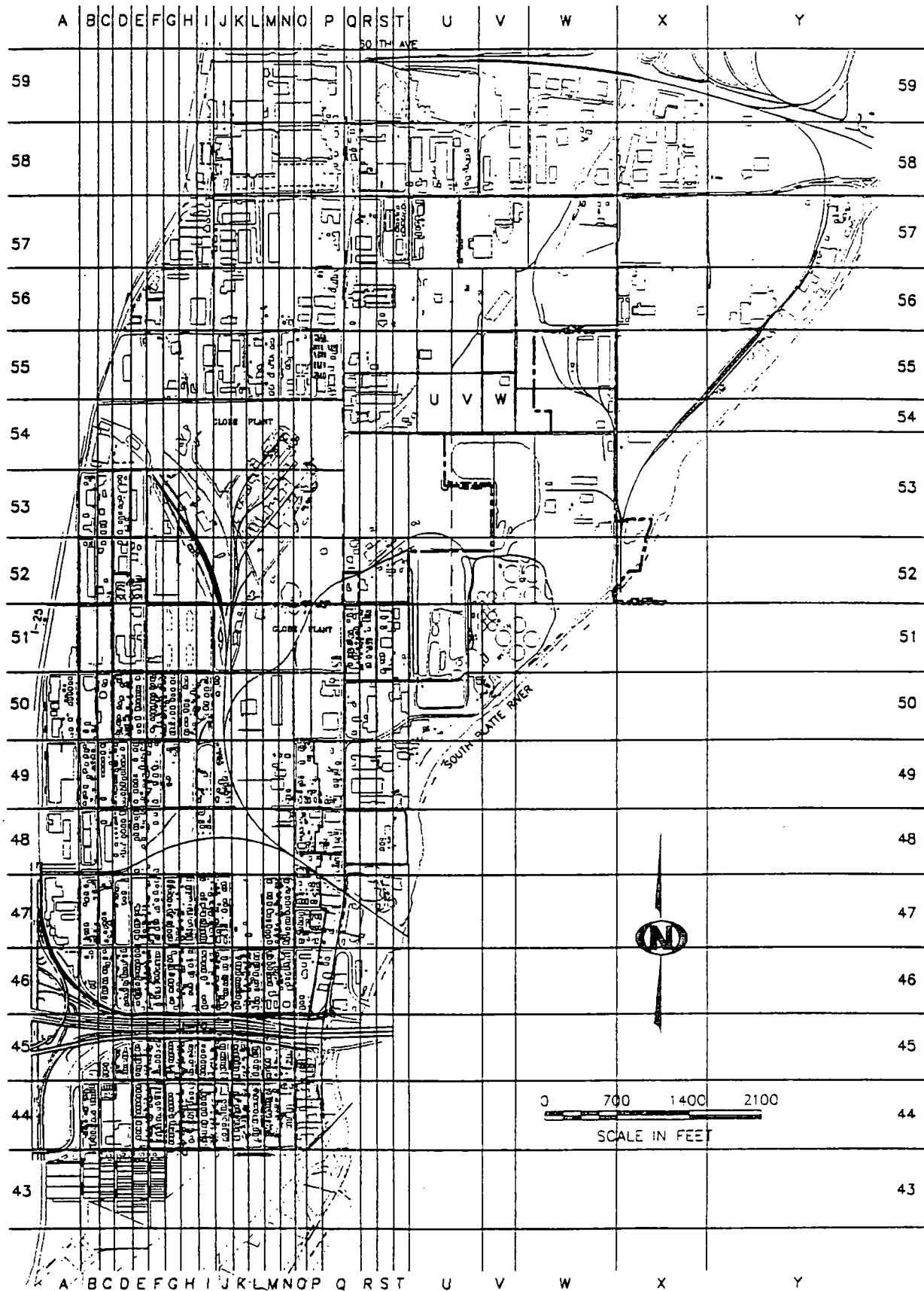


Fig. 1.1 Globe Plant Area Map

## 2.0 SOIL SAMPLING

The additional properties that were sampled during the 1997 sampling season as part of the arsenic anomaly evaluation are listed in Appendix B and illustrated on the Vicinity Maps in Appendix A. During the 1997 sampling season, additional soil samples were collected from 27 properties, consisting of 23 residential properties and 4 commercial properties. A summary of the analytical results for these properties is presented in Appendix B. Each Vicinity Map contains a drawing of the designated property or properties described in the Vicinity Map's title block. The sectors for each property are also shown and numbered on the Vicinity Map's.

Property number 50I23, located at 5001 Logan Street, Denver, Colorado was initially classified Buffer as reported in the 1993 SUP DIR, but upon completion of the arsenic anomaly soil sampling the property has been reclassified Primary.

### 2.1 Sample Locations

Property base maps containing delineated sectors (from the original sampling collected as part of the SOW program, which are reported in previous DIR's) were used for soil sampling purposes.

The soil sample location within the chosen sector of the designated property was randomly selected in the field such that every possible location within the sector (not covered by adequate asphalt, concrete or buildings) had an equal chance of being selected.

The random sample location within the sector was selected on each property base map by the following process: (1) the maximum length of the east-west and north-south sides of the sector was determined, (2) the random sample location was selected based on random number tables or pseudo-random number algorithms (such as contained in a calculator or spreadsheet computer program) to generate distances in one foot intervals from the southwest corner of the sector for each direction resulting in a unique location, and (3) the selected random sample location was recorded on the property map or in the field book. If a randomly selected sample location proven impractical in the

field because it fell on a feature such as a building, sidewalk, or tree, it was discarded and a new random sample location was selected using the same procedure. The selected random sample location was located in the field by measuring distances from the southwest corner or from physical features such as building corners, sidewalks and fences.

## 2.2 Sample Collection Procedures

At each of the sample locations, soil samples were collected using one of the following two types of sampling equipment:

- A 12" stainless steel tube and handle with foot step which was driven to depth using either the foot step or a dead blow hammer (for collection of shallow soils from the existing ground surface to approximately one foot below ground surface).
- A hand shovel and post hole digger (for collection of deep soils from approximately 1' to 3' below the existing ground surface).

Samples were collected, labeled and delivered to either Paragon Analytics, Inc. in Fort Collins, Colorado or Core Laboratories, Inc. in Aurora, Colorado under Chain of Custody procedures as described in the Remedial Design/Remedial Action Quality Assurance Project Plan (QAPP). After collection and prior to delivery to the laboratory, the samples were stored in a locked room accessible only to sampling personnel.

To avoid cross contamination of samples between sectors and at various depths on a given property the sampling equipment was brushed free of visible soil. Before moving onto a different property the sampling equipment was decontaminated. Investigative derived wastes consisted of decontamination water produced when the sampling equipment was cleaned. The sample tubes, hand shovel and post hole digger were decontaminated as described in the QAPP.

### 3.0 LABORATORY

Paragon Analytics, Inc. laboratory and Core Laboratories, Inc. prepared and analyzed the soil samples as described in the 1997 Design Investigation Plan (DIP) for Community Soils and Vegetable Gardens Operable Unit. Samples were analyzed for total concentrations of arsenic, cadmium, copper, iron, lead, phosphorous and zinc by Inductively Coupled Plasma (ICP) Method 6010A. Inorganic Phosphate was calculated and reported by the laboratory using the analytical results from total phosphorous concentrations. Soil samples were also analyzed for concentrations of arsenic, cadmium, lead, and zinc in an extract created using the Synthetic Precipitation Leaching Procedure (SPLP) by ICP Method 6010A and soil pH by Method 9045B. Soil samples were analyzed for selected analytes referenced above (all soil samples were not analyzed for every analyte listed). The laboratories followed QC procedures specified in the QAPP (see section 4.0).

### 4.0 QUALITY ASSURANCE

Soil sample collection and analysis met the procedures and criteria outlined in the QAPP, including use of properly trained personnel; sample collection, preservation, and documentation; laboratory QC tests; and validation of laboratory data results. Laboratory Control Samples, Continuing Calibration Verification Samples and calibration criteria were also met.

#### 4.1 Data Validation

All laboratory analytical data results met the data validation procedures and criteria outlined in the QAPP. All internal laboratory quality control tests met the QAPP criteria for accuracy, precision, and completeness. All samples were analyzed within the required holding time limits specified in SW-846.

#### 4.2 Conclusions

In conclusion, the data presented in this report are considered to be valid and 100% complete

AA DIR  
Arsenic Anomaly  
Globe Plant Site

Revision 0  
January 1998

for the area sampled.

**APPENDIX B**  
**ANALYTICAL RESULTS**

TESTILTS

Property Number	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm SPLP Arsenic, mg/L	Cadmium, ppm SPLP Cadmium, mg/L	Lead, ppm SPLP Lead, mg/L	Zinc, ppm SPLP Zinc, mg/L	Copper, ppm SPLP Copper, mg/L	Iron, ppm SPLP Iron, mg/L	Phosphate ppm	Soil Ph
44E09			08/14/97	517							
4438 LINCOLN B											
44E09			08/07/97	1870							
4438 LINCOLN F											
44E09			08/07/97	1570							
4438 LINCOLN 1 GROUND											
44E09			08/07/97	1510							
4438 LINCOLN 2 GROUND											
44E09			08/14/97	527							
4438 LINCOLN B GROUND											
44E09 004	0 - 2	07/24/97	1230	10	554	276	42	14600	3555		
4438 LINCOLN ST											
44E09 004	12 - 18	07/24/97	151	-1	77	99	40	21000	1946		
4438 LINCOLN ST											
44E09 004	2 - 4	07/24/97	1230	9	424	211	37	17000	3340		
4438 LINCOLN ST											
44E09 004	4 - 6	07/24/97	328	8	337	302	84	17400	2562		
4438 LINCOLN ST											
44E09 004	6 - 8	07/24/97	251	5	315	294	93	16300	1866		
4438 LINCOLN ST											
44E09 004	8 - 10	07/24/97	229	4	326	277	119	17900	2023		
4438 LINCOLN ST											
44E09 004	10 - 12	07/24/97	176	2	128	139	62	19900	1955		
4438 LINCOLN ST											
44E09 004	18 - 24	07/24/97	68	-1	14	56	13	18700	1658		
4438 LINCOLN ST											
44E09 004	24 - 30	07/24/97	18	-1	10	49	13	18000	1710		
4438 LINCOLN ST											
44E09 004	30 - 36	07/24/97	9	-1	12	61	14	21600	1780		
4438 LINCOLN ST											
45E12 002	0 - 2	07/22/97	-6	6	300	398	49	14700	4352		
4530 LINCOLN ST											
45E12 002	12 - 18	07/22/97	7	1	80	221	36	11800	2050		
4530 LINCOLN ST											
45E12 002	2 - 4	07/22/97	-6	5	269	406	54	19000	4394		
4530 LINCOLN ST											
45E12 002	4 - 6	07/22/97	6	3	128	230	46	23400	3126		
4530 LINCOLN ST											

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

TEST      JLTS

Property Number	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm SPLP Arsenic, mg/L	Cadmium, ppm SPLP Cadmium, mg/L	Lead, ppm SPLP Lead, mg/L	Zinc, ppm SPLP Zinc, mg/L	Copper, ppm SPLP Copper, mg/L	Iron, ppm SPLP Iron, mg/L	Phosphate ppm	Soil Ph
45E12	002	6 - 8	07/22/97	-6 SPLP Arsenic, mg/L	5 SPLP Cadmium, mg/L	1230 SPLP Lead, mg/L	462 SPLP Zinc, mg/L	57 SPLP Copper, mg/L	17800 SPLP Iron, mg/L	3052	
4530 LINCOLN ST											
45E12	002	8 - 10	07/22/97	-6 SPLP Arsenic, mg/L	3 SPLP Cadmium, mg/L	200 SPLP Lead, mg/L	496 SPLP Zinc, mg/L	54 SPLP Copper, mg/L	15700 SPLP Iron, mg/L	2516	
4530 LINCOLN ST											
45E12	002	10 - 12	07/22/97	7 SPLP Arsenic, mg/L	3 SPLP Cadmium, mg/L	269 SPLP Lead, mg/L	511 SPLP Zinc, mg/L	65 SPLP Copper, mg/L	14300 SPLP Iron, mg/L	2764	
4530 LINCOLN ST											
45E12	002	18 - 24	07/22/97	-6 SPLP Arsenic, mg/L	-1 SPLP Cadmium, mg/L	40 SPLP Lead, mg/L	79 SPLP Zinc, mg/L	31 SPLP Copper, mg/L	10800 SPLP Iron, mg/L	1450	
4530 LINCOLN ST											
45E12	002	24 - 30	07/22/97	-6 SPLP Arsenic, mg/L	-1 SPLP Cadmium, mg/L	43 SPLP Lead, mg/L	54 SPLP Zinc, mg/L	34 SPLP Copper, mg/L	11100 SPLP Iron, mg/L	1643	
4530 LINCOLN ST											
45E12	002	30 - 36	07/22/97	-6 SPLP Arsenic, mg/L	-1 SPLP Cadmium, mg/L	294 SPLP Lead, mg/L	101 SPLP Zinc, mg/L	63 SPLP Copper, mg/L	15200 SPLP Iron, mg/L	8182	
4530 LINCOLN ST											
45F23	002	0 - 2	09/24/97	128 0.670	8 0.002	504 0.069	341 0.989				
4535 SHERMAN ST											
45F23	002	0 - 2	07/22/97	118 0.240	9 -0.005	940 -0.050	428 0.500				6.42
4535 SHERMAN ST											
45F23	002	0 - 2	07/22/97	104	7	3130	400	66	17000	6773	
4535 SHERMAN ST											
45F23	002	12 - 18	07/22/97	24	3	2420	321	64	18200	5240	
4535 SHERMAN ST											
45F23	002	2 - 4	07/22/97	83	7	647	428	63	17300	6803	
4535 SHERMAN ST											
45F23	002	4 - 6	07/22/97	54	6	602	388	63	19100	5853	
4535 SHERMAN ST											
45F23	002	6 - 8	07/22/97	41	5	423	401	62	17600	6037	
4535 SHERMAN ST											
45F23	002	8 - 10	07/22/97	35	5	632	517	91	19200	6282	
4535 SHERMAN ST											
45F23	002	10 - 12	07/22/97	26	4	376	455	63	19100	5455	
4535 SHERMAN ST											
45F23	002	18 - 24	07/22/97	22	4	19000	335	100	15800	5302	
4535 SHERMAN ST											
45F23	002	24 - 30	07/22/97	19	3	858	200	124	22400	3432	
4535 SHERMAN ST											
45F23	002	30 - 36	07/22/97	10	-1	1350	121	36	20700	2832	
4535 SHERMAN ST											
45G08	002	0 - 2	09/24/97	415 1.490	7 0.001	512 0.015	257 0.517				6.79
4548 SHERMAN ST											

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

Property Number	Se. Number	Depth of Sample (inches)	Sample date	Arsenic, ppm SPLP Arsenic, mg/L	Cadmium, ppm SPLP Cadmium, mg/L	Lead, ppm SPLP Lead, mg/L	Zinc, ppm SPLP Zinc, mg/L	Copper, ppm SPLP Copper, mg/L	Iron, ppm SPLP Iron, mg/L	Phosphate ppm	Soil Ph
Address											
45G08	002	0 - 2	07/22/97	392	9	835	201	44	21900	4719	
4548 SHERMAN ST											
45G08	002	12 - 18	07/22/97	59	4	271	213	78	22800	3025	
4548 SHERMAN ST											
45G08	002	2 - 4	07/22/97	383	8	626	184	106	21600	4229	
4548 SHERMAN ST											
45G08	002	4 - 6	07/22/97	273	4	274	131	42	23500	3126	
4548 SHERMAN ST											
45G08	002	6 - 8	07/22/97	177	2	175	114	63	23900	2623	
4548 SHERMAN ST											
45G08	002	8 - 10	07/22/97	120	2	138	116	44	23200	2445	
4548 SHERMAN ST											
45G08	002	10 - 12	07/22/97	116	2	178	139	50	24600	2902	
4548 SHERMAN ST											
45G08	002	18 - 24	07/22/97	28	4	4350	166	123	22600	4045	
4548 SHERMAN ST											
45G08	002	24 - 30	07/22/97	10	-1	44	78	26	22600	2470	
4548 SHERMAN ST											
45G08	002	30 - 36	07/22/97	8	-1	23	75	23	24400	2544	
4548 SHERMAN ST											
45H22	003	0 - 2	07/22/97	-6	9	307	312	47	19400	5026	
4545 GRANT ST											
45H22	003	12 - 18	07/22/97	7	2	90	113	58	20600	2786	
4545 GRANT ST											
45H22	003	2 - 4	07/22/97	-6	9	310	429	65	18800	4137	
4545 GRANT ST											
45H22	003	4 - 6	07/22/97	6	6	207	250	54	14900	3126	
4545 GRANT ST											
45H22	003	6 - 8	07/22/97	14	5	275	318	111	18000	4168	
4545 GRANT ST											
45H22	003	8 - 10	07/22/97	18	5	356	364	148	21000	5455	
4545 GRANT ST											
45H22	003	10 - 12	07/22/97	15	5	344	274	143	22400	4811	
4545 GRANT ST											
45H22	003	18 - 24	07/22/97	-6	-1	15	63	20	19200	2130	
4545 GRANT ST											
45H22	003	24 - 30	07/22/97	-6	-1	13	58	18	19000	2127	
4545 GRANT ST											

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

**TEST RESULTS**

Property Number Address	Sector Number	Depth of Sample (Inches)	Sample date	Arsenic, ppm <i>SPLP Arsenic, mg/L</i>	Cadmium, ppm <i>SPLP Cadmium, mg/L</i>	Lead, ppm <i>SPLP Lead, mg/L</i>	Zinc, ppm <i>SPLP Zinc, mg/L</i>	Copper, ppm <i>SPLP Copper, mg/L</i>	Iron, ppm <i>SPLP Iron, mg/L</i>	Phosphate ppm	Soil Ph
45H22 4545 GRANT ST	003	30 - 36	07/22/97	-6	-1	10	53	26	16900	1989	
45J17 4519 LOGAN ST	003	0 - 2	07/24/97	157	8	543	334	34	10200	3769	
45J17 4519 LOGAN ST	003	12 - 18	07/24/97	49	3	307	155	58	19200	3095	
45J17 4519 LOGAN ST	003	2 - 4	07/24/97	387	10	804	469	63	13800	4934	
45J17 4519 LOGAN ST	003	4 - 6	07/24/97	209	9	526	508	69	17100	5976	
45J17 4519 LOGAN ST	003	6 - 8	07/24/97	115	11	532	474	69	17400	6252	
45J17 4519 LOGAN ST	003	8 - 10	07/24/97	111	14	614	554	106	19700	7508	
45J17 4519 LOGAN ST	003	10 - 12	07/24/97	80	11	484	390	93	20200	4781	
45J17 4519 LOGAN ST	003	18 - 24	07/24/97	35	-1	28	77	22	21300	2357	
45J17 4519 LOGAN ST	003	24 - 30	07/24/97	18	-1	17	67	21	20200	2182	
45J17 4519 LOGAN ST	003	30 - 36	07/24/97	-6	-1	17	79	25	23700	2375	
45J18 4523 LOGAN ST	004	0 - 2	09/24/97	1170 6.480	8 0.002	497 0.033	414 1.060				6.08
45J18 4523 LOGAN ST	004	0 - 2	10/22/97	497	14	467	297				6.50
45J18 4523 LOGAN ST	004	0 - 6	10/22/97	349	12	402	329				6.77
45J18 4523 LOGAN ST	004	4 - 6	10/22/97	860	18	421	266				6.33
45J18 4523 LOGAN ST	004	6 - 8	10/22/97	245	8	380	253				6.78
45J18 4523 LOGAN ST	004	8 - 10	10/22/97	146	5	186	174				6.79
45J18 4523 LOGAN ST	004	10 - 12	10/22/97	208	8	319	245				6.76
45J20 4529 LOGAN ST	001	0 - 2	10/22/97	442	25	458	401				6.41

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

**TEST** / **LTS**

Property Number Address	Sector Number	Depth of Sample (Inches)	Sample date	Arsenic, ppm <i>SPLP Arsenic, mg/L</i>	Cadmium, ppm <i>SPLP Cadmium, mg/L</i>	Lead, ppm <i>SPLP Lead, mg/L</i>	Zinc, ppm <i>SPLP Zinc, mg/L</i>	Copper, ppm <i>SPLP Copper, mg/L</i>	Iron, ppm <i>SPLP Iron, mg/L</i>	Phosphate ppm	Soil Ph
45J20 4529 LOGAN ST	001	2 - 4	10/22/97	255	17	333	304				6.60
45J20 4529 LOGAN ST	001	4 - 6	10/22/97	191	11	330	269				6.73
45J20 4529 LOGAN ST	001	6 - 8	10/22/97	178	11	298	294				6.75
45J20 4529 LOGAN ST	001	8 - 10	10/22/97	54	3	137	121				6.79
45J20 4529 LOGAN ST	001	10 - 12	10/22/97	35	3	189	119				6.44
45K12 4520 LOGAN ST	002	0 - 2	07/24/97	7	10	265	301	49	18400	4965	
45K12 4520 LOGAN ST	002	12 - 18	07/24/97	-6	-1	38	81	23	18500	1857	
45K12 4520 LOGAN ST	002	2 - 4	07/24/97	6	12	316	361	55	20300	4076	
45K12 4520 LOGAN ST	002	4 - 6	07/24/97	7	11	263	326	54	18800	3494	
45K12 4520 LOGAN ST	002	6 - 8	07/24/97	7	4	179	289	76	18700	2593	
45K12 4520 LOGAN ST	002	8 - 10	07/24/97	8	3	130	214	50	17100	2145	
45K12 4520 LOGAN ST	002	10 - 12	07/24/97	-6	3	114	201	41	17000	2127	
45K12 4520 LOGAN ST	002	18 - 24	07/24/97	-6	-1	18	77	21	24200	2029	
45K12 4520 LOGAN ST	002	24 - 30	07/24/97	-6	-1	15	77	20	24400	1817	
45K12 4520 LOGAN ST	002	30 - 36	07/24/97	-6	-1	16	73	19	23600	1692	
45K13 4510 LOGAN ST	001	0 - 2	07/24/97	-6	5	179	267	45	17900	2945	
45K13 4510 LOGAN ST	001	12 - 18	07/24/97	-6	2	79	125	37	20200	2041	
45K13 4510 LOGAN ST	001	2 - 4	07/24/97	6	6	204	284	49	17800	2706	
45K13 4510 LOGAN ST	001	4 - 6	07/24/97	8	6	184	264	48	17800	2470	

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

TEST RESULTS

Property Number	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm SPLP Arsenic, mg/L	Cadmium, ppm SPLP Cadmium, mg/L	Lead, ppm SPLP Lead, mg/L	Zinc, ppm SPLP Zinc, mg/L	Copper, ppm SPLP Copper, mg/L	Iron, ppm SPLP Iron, mg/L	Phosphate ppm	Soil Ph
45K13	001	6 - 8	07/24/97	7	4	179	259	63	16300	2642	
4510 LOGAN ST											
45K13	001	8 - 10	07/24/97	9	4	163	250	52	20700	2844	
4510 LOGAN ST											
45K13	001	10 - 12	07/24/97	7	3	108	196	37	19900	2507	
4510 LOGAN ST											
45K13	001	18 - 24	07/24/97	-6	-1	20	71	20	20400	1921	
4510 LOGAN ST											
45K13	001	24 - 30	07/24/97	-6	-1	17	75	19	21200	1848	
4510 LOGAN ST											
45K13	001	30 - 36	07/24/97	-6	-1	12	67	19	21100	1915	
4510 LOGAN ST											
45L16	002	0 - 2	07/24/97	572	9	465	234	37	14400	3953	
4519 PENNSYLVANIA ST											
45L16	002	12 - 18	07/24/97	101	4	248	259	66	20800	4352	
4519 PENNSYLVANIA ST											
45L16	002	2 - 4	07/22/97	224	11	466	217				6.68
4519 PENNSYLVANIA ST											
45L16	002	2 - 4	07/24/97	0.820	-0.005	-0.050	0.330				
4519 PENNSYLVANIA ST											
45L16	002	2 - 4	07/24/97	198	8	449	202	50	17600	3432	
4519 PENNSYLVANIA ST											
45L16	002	4 - 6	07/24/97	213	7	418	207	51	19100	3432	
4519 PENNSYLVANIA ST											
45L16	002	6 - 8	07/24/97	191	5	236	187	54	21300	3371	
4519 PENNSYLVANIA ST											
45L16	002	8 - 10	07/24/97	170	3	243	178	48	20300	3126	
4519 PENNSYLVANIA ST											
45L16	002	10 - 12	07/24/97	148	3	205	226	56	18800	3524	
4519 PENNSYLVANIA ST											
45L16	002	18 - 24	07/24/97	25	1	64	98	29	18700	2537	
4519 PENNSYLVANIA ST											
45L16	002	24 - 30	07/24/97	-6	-1	19	55	15	17900	2182	
4519 PENNSYLVANIA ST											
45L16	002	30 - 36	07/24/97	-6	-1	17	57	20	19300	1950	
4519 PENNSYLVANIA ST											
46C10	002	0 - 2	12/11/97	53	15	394	488				
4645 LOGAN ST											
46C10	002	2 - 4	12/11/97	43	9	425	358				
4645 LOGAN ST											

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

TEST JLTS

Property Number Address	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm <i>SPLP Arsenic, mg/L</i>	Cadmium, ppm <i>SPLP Cadmium, mg/L</i>	Lead, ppm <i>SPLP Lead, mg/L</i>	Zinc, ppm <i>SPLP Zinc, mg/L</i>	Copper, ppm <i>SPLP Copper, mg/L</i>	Iron, ppm <i>SPLP Iron, mg/L</i>	Phosphate ppm	Soil Ph
46C10 4645 LOGAN ST	002	4 - 6	12/11/97	27	6	381	309				
46C10 4645 LOGAN ST	002	6 - 8	12/11/97	21	5	339	283				
46C10 4645 LOGAN ST	002	8 - 10	12/11/97	23	4	476	273				
46C10 4645 LOGAN ST	002	10 - 12	12/11/97	14	4	163	162				
46J07 4645 LOGAN ST	001	0 - 2	12/11/97	64	9	269	194				
46J07 4645 LOGAN ST	001	2 - 4	12/11/97	97	8	231	163				
46J07 4645 LOGAN ST	001	4 - 6	12/11/97	97	7	233	159				
46J07 4645 LOGAN ST	001	6 - 8	12/11/97	118	6	267	189				
46J07 4645 LOGAN ST	001	8 - 10	12/11/97	95	5	266	181				
46J07 4645 LOGAN ST	001	10 - 12	12/11/97	75	5	239	171				
46K12 4622 LOGAN ST	005	0 - 2	12/11/97	33	6	207	243				
46K12 4622 LOGAN ST	005	2 - 4	12/11/97	38	6	214	255				
46K12 4622 LOGAN ST	005	4 - 6	12/11/97	43	6	225	262				
46K12 4622 LOGAN ST	005	6 - 8	12/11/97	44	7	288	311				
46K12 4622 LOGAN ST	005	8 - 10	12/11/97	32	8	320	320				
46K12 4622 LOGAN ST	005	10 - 12	12/11/97	20	8	328	295				
46L19 4635 PENNSYLVANIA ST	002	0 - 2	12/11/97	65	4	168	215				
46L19 4635 PENNSYLVANIA ST	002	2 - 4	12/11/97	50	3	104	136				
46L19 4635 PENNSYLVANIA ST	002	4 - 6	12/11/97	45	2	64	113				

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

TEST / LTS

Property Number Address	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm <i>SPLP Arsenic, mg/L</i>	Cadmium, ppm <i>SPLP Cadmium, mg/L</i>	Lead, ppm <i>SPLP Lead, mg/L</i>	Zinc, ppm <i>SPLP Zinc, mg/L</i>	Copper, ppm <i>SPLP Copper, mg/L</i>	Iron, ppm <i>SPLP Iron, mg/L</i>	Phosphate ppm	Soil Ph
46L19 4635 PENNSYLVANIA ST	002	6 - 8	12/11/97	16	2	79	123				
46L19 4635 PENNSYLVANIA ST	002	8 - 10	12/11/97	8	2	65	100				
46L19 4635 PENNSYLVANIA ST	002	10 - 12	12/11/97	-6	1	55	88				
46M01 4684 PENNSYLVANIA ST	004	0 - 2	12/11/97	177	9	285	246				
46M01 4684 PENNSYLVANIA ST	004	2 - 4	12/11/97	176	11	493	255				
46M01 4684 PENNSYLVANIA ST	004	4 - 6	12/11/97	189	10	358	257				
46M01 4684 PENNSYLVANIA ST	004	6 - 8	12/11/97	93	4	174	145				
46M01 4684 PENNSYLVANIA ST	004	8 - 10	12/11/97	33	1	80	70				
46M01 4684 PENNSYLVANIA ST	004	10 - 12	12/11/97	43	2	68	71				
46M05 4658 PENNSYLVANIA ST	001	0 - 2	12/11/97	14	7	450	506				
46M05 4658 PENNSYLVANIA ST	001	2 - 4	12/11/97	13	6	375	406				
46M05 4658 PENNSYLVANIA ST	001	4 - 6	12/11/97	22	7	423	413				
46M05 4658 PENNSYLVANIA ST	001	6 - 8	12/11/97	19	5	441	319				
46M05 4658 PENNSYLVANIA ST	001	8 - 10	12/11/97	17	6	319	232				
46M05 4658 PENNSYLVANIA ST	001	10 - 12	12/11/97	16	5	343	316				
46O06 4600 PEARL ST	002	0 - 2	12/11/97	126	18	271	592				
46O06 4600 PEARL ST	002	2 - 4	12/11/97	41	10	125	221				
46O06 4600 PEARL ST	002	4 - 6	12/11/97	254	18	366	311				
46O06 4600 PEARL ST	002	6 - 8	12/11/97	256	18	369	314				

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
*results in mg/L = milligrams per liter*

negative results = below detection limit  
no entry = not tested

TESTLTS

Property Number	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm SPLP Arsenic, mg/L	Cadmium, ppm SPLP Cadmium, mg/L	Lead, ppm SPLP Lead, mg/L	Zinc, ppm SPLP Zinc, mg/L	Copper, ppm SPLP Copper, mg/L	Iron, ppm SPLP Iron, mg/L	Phosphate ppm	Soil Ph
46006	002	8 - 10	12/11/97	65	21	138	336				
4600 PEARL ST											
46006	002	10 - 12	12/11/97	102	21	215	324				
4600 PEARL ST											
47P09	003	0 - 2	12/11/97	-6	1	42	119				
4705 WASHINGTON ST											
47P09	003	2 - 4	12/11/97	-6	3	130	229				
4705 WASHINGTON ST											
47P09	003	4 - 6	12/11/97	9	5	194	324				
4705 WASHINGTON ST											
47P09	003	6 - 8	12/11/97	6	7	322	594				
4705 WASHINGTON ST											
47P09	003	8 - 10	12/11/97	12	5	396	784				
4705 WASHINGTON ST											
47P09	003	10 - 12	12/11/97	-6	2	94	277				
4705 WASHINGTON ST											
48R12	009	0 - 2	10/22/97	7	9	145	. 159				6.28
4801 CLARKSON ST											
48R12	009	2 - 4	10/22/97	6	2	47	46				6.67
4801 CLARKSON ST											
48R12	009	4 - 6	10/22/97	-5	-1	-5	14				7.02
4801 CLARKSON ST											
48R12	009	6 - 8	10/22/97	-5	1	9	19				6.95
4801 CLARKSON ST											
48R12	009	8 - 10	10/22/97	-5	-1	8	15				6.91
4801 CLARKSON ST											
48R12	009	10 - 12	10/22/97	-5	-1	-5	8				8.13
4801 CLARKSON ST											
48R12	012	0 - 2	10/22/97	23	18	405	916				8.35
4801 CLARKSON ST											
48R12	012	2 - 4	10/22/97	-5	1	-5	14				8.29
4801 CLARKSON ST											
48R12	012	4 - 6	10/22/97	7	3	46	63				8.60
4801 CLARKSON ST											
48R12	012	6 - 8	10/22/97	-5	3	68	77				8.27
4801 CLARKSON ST											
48R12	012	8 - 10	10/22/97	-5	1	17	39				8.57
4801 CLARKSON ST											

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

TEST      JLTS

Property Number	Sector Number	Depth of Sample (inches)	Sample date	Arsenic, ppm <i>SPLP Arsenic, mg/L</i>	Cadmium, ppm <i>SPLP Cadmium, mg/L</i>	Lead, ppm <i>SPLP Lead, mg/L</i>	Zinc, ppm <i>SPLP Zinc, mg/L</i>	Copper, ppm <i>SPLP Copper, mg/L</i>	Iron, ppm <i>SPLP Iron, mg/L</i>	Phosphate ppm	Soil Ph
48R12	012	10 - 12	10/22/97	-5	-1	7	15				8.34
4801 CLARKSON ST											
50I23	004	0 - 2	10/22/97	11	8	300	166				8.17
5001 LOGAN ST											
50I23	004	2 - 4	10/22/97	25	12	506	211				7.99
5001 LOGAN ST											
50I23	004	4 - 6	10/22/97	25	12	264	206				7.87
5001 LOGAN ST											
50I23	004	6 - 8	10/22/97	42	16	375	502				7.82
5001 LOGAN ST											
50I23	004	8 - 10	10/22/97	121	13	344	338				7.43
5001 LOGAN ST											
50I23	004	10 - 12	10/22/97	44	8	321	245				7.53
5001 LOGAN ST											
51Q37	008	0 - 2	10/22/97	24	40	318	671				6.92
5158 WASHINGTON ST											
51Q37	008	2 - 4	10/22/97	43	64	1300	5850				6.77
5158 WASHINGTON ST											
51Q37	008	4 - 6	10/22/97	50	67	760	1680				6.71
5158 WASHINGTON ST											
51Q37	008	6 - 8	10/22/97	70	80	3100	12800				6.86
5158 WASHINGTON ST											
51Q37	008	8 - 10	10/22/97	100	97	3200	11400				6.77
5158 WASHINGTON ST											
51Q37	008	10 - 12	10/22/97	122	62	2110	3400				6.54
5158 WASHINGTON ST											
55M05	007	0 - 2	10/22/97	5	8	60	77				9.74
5503 PENNSYLVANIA ST											
55M05	007	0 - 6	09/24/97	197 0.500	44 0.007	450 0.051	201 0.100				7.69
5503 PENNSYLVANIA ST											
55M05	007	2 - 4	10/22/97	-5	13	64	95				9.47
5503 PENNSYLVANIA ST											
55M05	007	4 - 6	10/22/97	10	16	105	98				9.40
5503 PENNSYLVANIA ST											
55M05	007	6 - 8	10/22/97	27	30	97	123				9.57
5503 PENNSYLVANIA ST											
55M05	007	8 - 10	10/22/97	22	21	90	109				9.29
5503 PENNSYLVANIA ST											

NOTE: See Design Investigation Reports for  
soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested

TEST JLTS

Property Number Address	Sector Number	Depth of Sample (Inches)	Sample date	Arsenic, ppm <i>SPLP Arsenic, mg/L</i>	Cadmium, ppm <i>SPLP Cadmium, mg/L</i>	Lead, ppm <i>SPLP Lead, mg/L</i>	Zinc, ppm <i>SPLP Zinc, mg/L</i>	Copper, ppm <i>SPLP Copper, mg/L</i>	Iron, ppm <i>SPLP Iron, mg/L</i>	Phosphate ppm	Soil Ph
55M05 5503 PENNSYLVANIA ST	007	10 - 12	10/22/97	148	51	433	142				8.31
55N02 5550 PENNSYLVANIA ST	002	0 - 6	11/30/93	73 0.100	32 0.005	133 -0.050	151 0.130				7.73
55O13 5569 PEARL ST	003	0 - 2	10/22/97	47	14	157	188				7.13
55O13 5569 PEARL ST	003	0 - 2	08/01/95	101 0.200	27 0.027	272 -0.050	146 0.560				5.26
55O13 5569 PEARL ST	003	2 - 4	10/22/97	47	15	153	198				7.01
55O13 5569 PEARL ST	003	4 - 6	10/22/97	83	12	171	160				7.07
55O13 5569 PEARL ST	003	6 - 8	10/22/97	200	8	156	96				6.86
55O13 5569 PEARL ST	003	8 - 10	10/22/97	219	7	72	100				6.63
55O13 5569 PEARL ST	003	10 - 12	10/22/97	147	7	28	109				6.41
55O13 5569 PEARL ST	004	0 - 6	08/01/95	107 0.210	14 -0.005	880 0.070	443 0.160				7.85
55O15 5589 PEARL ST	008	0 - 12	07/14/95	173 0.210	37 0.007	456 -0.050	479 0.170				7.46
55O19 5549 PEARL ST	003	0 - 2	08/07/95	122 0.280	23 0.009	226 -0.050	183 0.220				7.14
55O19 5549 PEARL ST	003	0 - 6	08/07/95	102 0.300	16 0.009	810 -0.050	154 0.230				7.15

NOTE: See Design Investigation Reports for soils metals action levels and analytical results.

results in ppm = parts per million  
results in mg/L = milligrams per liter

negative results = below detection limit  
no entry = not tested